

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Exam: Function Reflections (practice version 0)

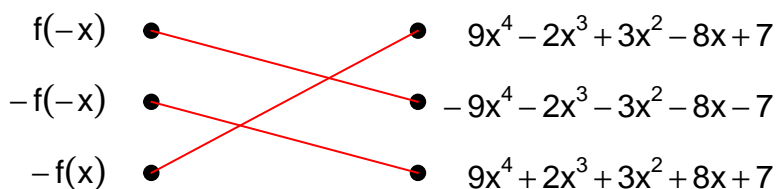
1. (worth 9 points) Let function  $f$  be defined by the polynomial below:

$$f(x) = -9x^4 + 2x^3 - 3x^2 + 8x - 7$$

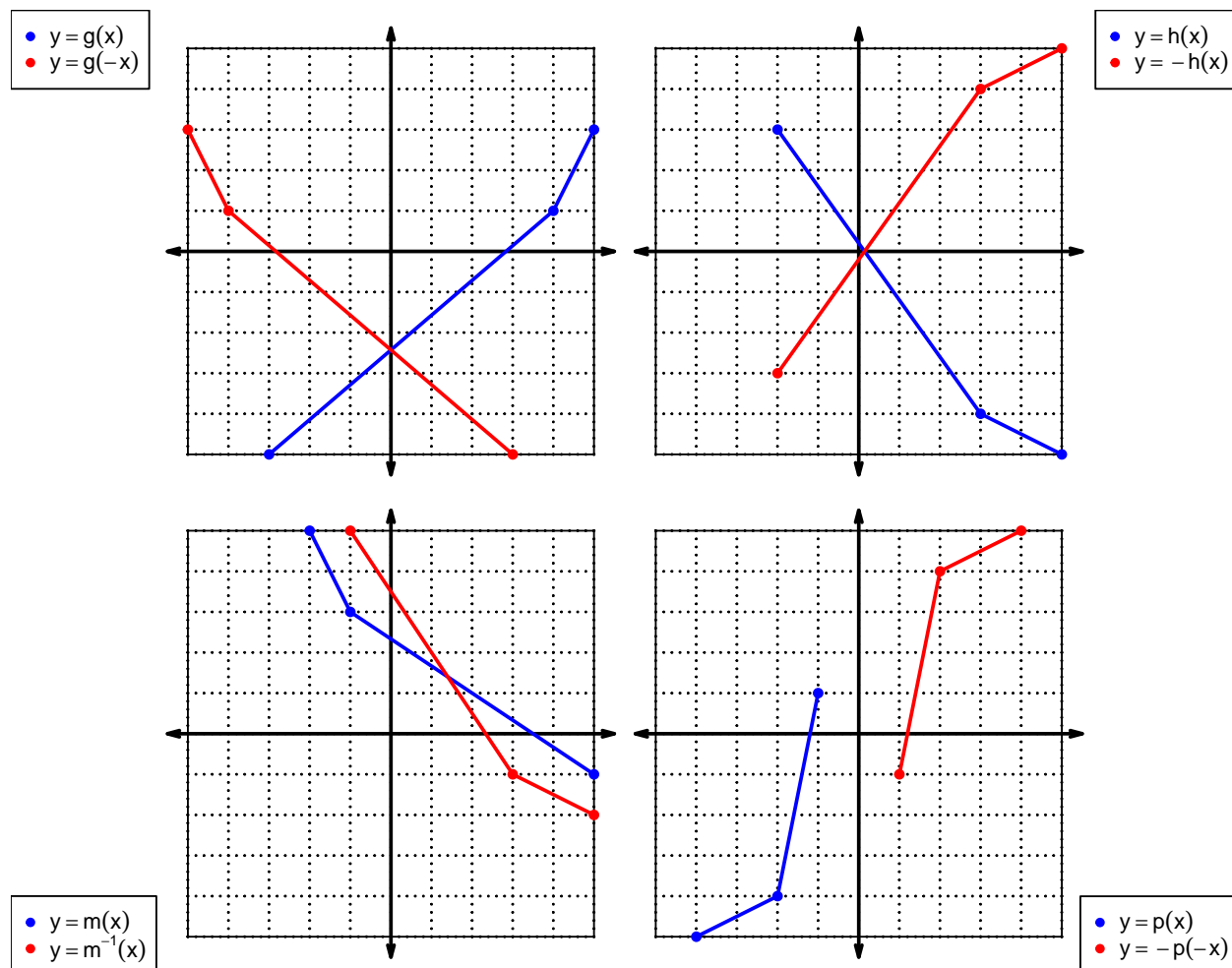
Draw lines that match each function reflection with its polynomial:

Reflections

Polynomials



2. (worth 20 points) In each  $xy$  plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The  $x$  axis is horizontal and the  $y$  axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions  $f$ ,  $g$ , and  $h$  are defined by the table below.

$x$	$f(x)$	$g(x)$	$h(x)$
1	6	6	4
2	5	4	3
3	2	8	6
4	3	7	8
5	7	3	1
6	4	9	7
7	9	1	2
8	8	2	5
9	1	5	9

3. (worth 3 points) Evaluate  $g(6)$ .

$$g(6) = 9$$

4. (worth 3 points) Evaluate  $f^{-1}(7)$ .

$$f^{-1}(7) = 5$$

5. (worth 3 points) Assuming  $h$  is an **even** function, evaluate  $h(-1)$ .

If function  $h$  is even, then

$$h(-1) = 4$$

6. (worth 3 points) Assuming  $g$  is an **odd** function, evaluate  $g(-2)$ .

If function  $g$  is odd, then

$$g(-2) = -4$$

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7. (worth 15 points) A function,  $f$ , is **even** if  $f(x) = f(-x)$  for all  $x$  in the domain. A function,  $g$ , is **odd** if  $g(x) = -g(-x)$  for all  $x$  in the domain.

Let polynomial  $p$  be defined with the following equation:

$$p(x) = x^2 + x$$

- a. Express  $p(-x)$  as a polynomial in standard form.

$$p(-x) = (-x)^2 + (-x)$$

$$p(-x) = x^2 - x$$

- b. Express  $-p(-x)$  as a polynomial in standard form.

$$-p(-x) = -(x^2 - x)$$

$$-p(-x) = -x^2 + x$$

- c. Is polynomial  $p$  even, odd, or neither?

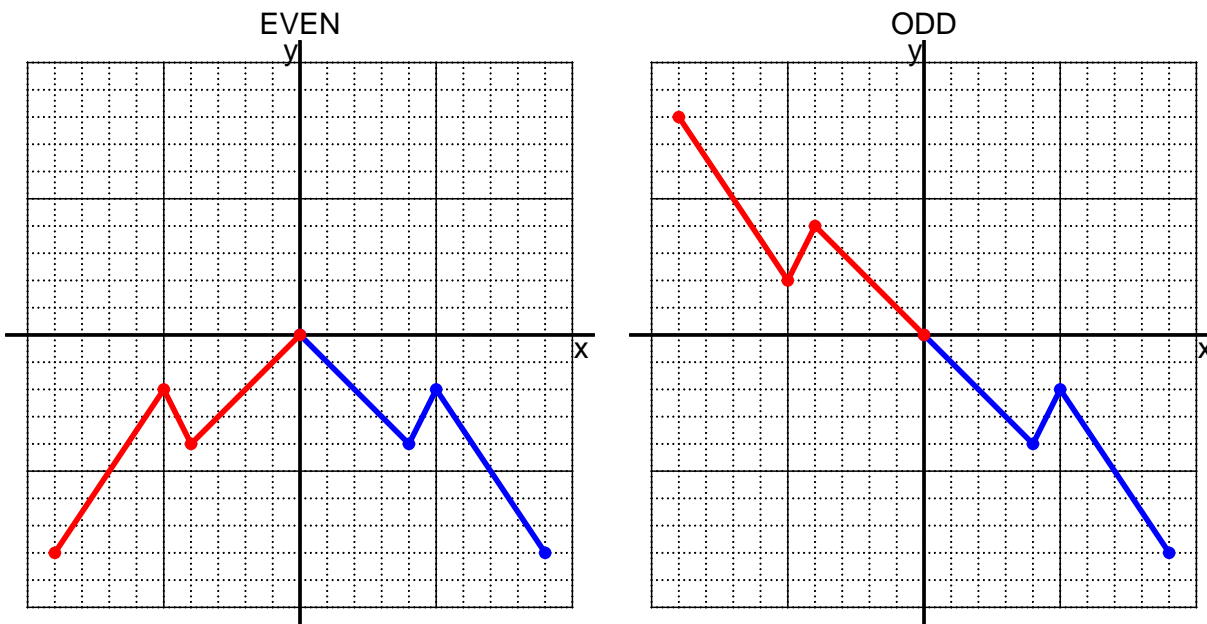
neither

- d. Explain how you know the answer to part c.

We see that  $p(x)$  is not equivalent to either  $p(-x)$  or  $-p(-x)$ , so  $p$  is neither even nor odd.

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8. (worth 10 points) I have drawn half of a function. Draw the other half to make it even or odd.



9. (worth 10 points) Let function  $f$  be defined with the equation below.

$$f(x) = \frac{x}{4} - 5$$

- a. Evaluate  $f(32)$ .

step 1: divide by 4  
step 2: subtract 5

$$f(32) = \frac{(32)}{4} - 5$$

$$f(32) = 3$$

- b. Evaluate  $f^{-1}(16)$ .

step 1: add 5  
step 2: multiply by 4

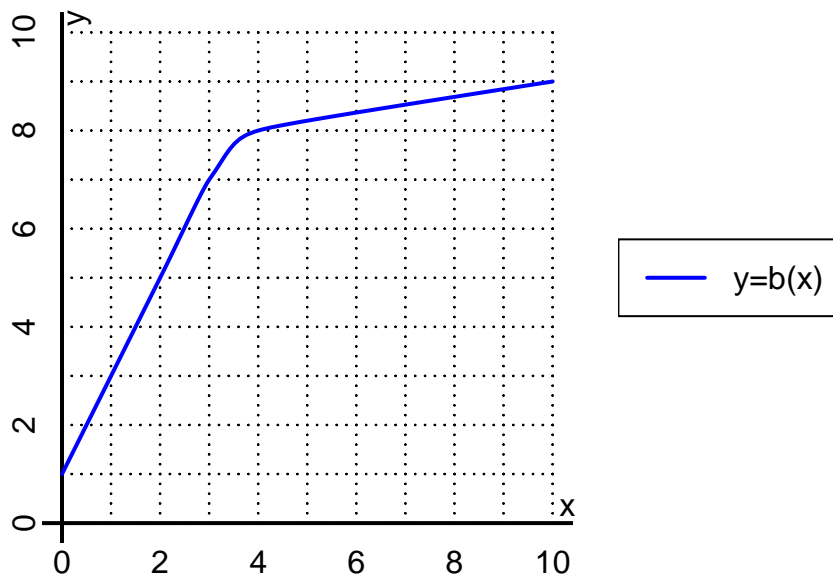
$$f^{-1}(x) = 4(x + 5)$$

$$f^{-1}(16) = 4((16) + 5)$$

$$f^{-1}(16) = 84$$

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10. (worth 6 points) The function  $b$  is represented by the curve  $y = b(x)$  graphed below.



a. Evaluate  $b(4)$ .

$$b(4) = 8$$

b. Evaluate  $b^{-1}(5)$ .

$$b^{-1}(5) = 2$$

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11. (worth 18 points) Function  $f$  is defined by the table below.

a. Complete the columns for  $-f(x)$  and  $f(-x)$  and  $-f(-x)$ .

$x$	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	4	-4	4	-4
-1	-9	9	-9	9
0	0	0	0	0
1	-9	9	-9	9
2	4	-4	4	-4

b. Is function  $f$  even, odd, or neither?

even

c. How do you know the answer to part b?

Function  $f$  is even because column  $f(-x)$  matches column  $f(x)$  exactly.